

## HISTORY AND DESCRIPTION OF THE BROOKLYN WATER WORKS.

To-day, marks an important era in the history of Brooklyn. The subject of supplying the city with water had for many successive years engaged the attention of its citizens, and after discussing numerous projects presented from time to time, in all their bearings, at public meetings, at private gatherings, and in the Common Council, definite plans were eventually adopted, the works commenced and practically completed, and now an abundance of clean, pure, fresh, flowing water, adapted for all necessary purposes, is flowing into the houses of the inhabitants. There is great rejoicing in consequence, and the event will be celebrated this day by the ringing of bells, the firing of cannon, music, processions, orations and fireworks. The military, firemen, trades and associations will all turn out, and thousands of invited guests will be present from a distance. It promises to be an occasion long to be remembered.

As early as the year 1834, the citizens of Brooklyn became so fully aware of the importance of a liberal supply of good water as to have public meetings on the subject, and action in regard thereto was taken in the Board of Trustees, but without definite results. Brooklyn was then a small village embracing an area of one mile square, and divided into fire districts. The boundaries consisted of the East River, Pacific street (then called District street), Red Hook lane and along a diagonal line to the corner of Flushing avenue and Navy street. There were eight fire engines, one hook and ladder company, and but few public edifices. In fact, great difficulty existed in those days in procuring water for the extinguishment of fires, which had become alarmingly frequent, and impelled the villagers to inquire into the means of supply. With this view, a Committee was appointed by the Board of Trustees, consisting of Gabriel Fumman, James Walters and Jonathan Trotter, who submitted the following report of their investigations on the 24th of March, 1834:

"The Committee to whom was referred the subject of supplying this village with water report that they are satisfied it is practicable to secure a full supply of pure and wholesome water for domestic use and for the extinguishment of fires, at an expense much less than it will cost to obtain the same by means of wells (and under an ordinary state of circumstances, they would feel no hesitation in urging upon the adoption of immediate means to obtain such supply).

"Your Committee have ascertained that water in a sufficient quantity, and of an excellent quality, may be obtained at the foot of the elevated ground of wells (and under an ordinary state of circumstances, they would feel no hesitation in urging upon the adoption of immediate means to obtain such supply).

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which it meets with an absolute fullness of water, since all below must naturally be filled with the element down to the solid substratum beneath. This is formed what is styled the "main spring," a permanent body of pure water, existing everywhere beneath the surface of the Island; fed by the superabundance of rain from above and discharging its surplus in turn, by percolation, laterally through the gravel into the ocean. Public opinion having almost universally adopted the idea, the manner of reaching and availing themselves of the supply to be derived from this main spring, was a subject, exciting much diversity of opinion and discussion among the people. The advocates of tapping it by the sinking of monster wells were at that time more numerous, though not more earnest than those who preferred to arrive at the same result by collecting the waters of the ponds and streams of the Island and bringing them into the city by means of a canal or conduit. There was still another portion of the community who preferred to arrange with New-York and secure a share of the Croton supply; but the reluctance on the part of New-York to permit anything to be done which would endanger the certainty and permanency of their own supply, caused that idea to be abandoned. It was the conflict between these various opinions and views, and the difficulty of concentrating the weight of a majority of the public sentiment in support of either of them, that more than any other cause protracted to so late a period any definite action upon the subject.

The great fire of September, 1848, when seven acres of buildings were destroyed, gave new impulse and vitality to the agitation for a water supply, which made itself apparent in the action of the Common Council. The subject was referred to a Special Committee of that body, who were authorized to expend \$10,000 in the purchase of a steam engine to be used in experiments for supplying the city with water. Various plans of supply were suggested to the Common Council by citizens taking an active interest in the matter, which were referred to a Special Committee, who promptly, on the 8th of January, 1849, submitted a report. The report detailed the examinations and investigations made by the Committee. It proposed no definite plan, but favored the sinking of wells from which the water should be conveyed to a reservoir on Prospect Hill, and thence distributed throughout the city. The reservoir was to contain eleven millions of gallons, and the amount of distribution-pipe estimated to be required was thirty-six miles. It was divided into two propositions—one proposing to furnish a supply for the extinguishment of fires solely, and the other a supply for all the uses of the inhabitants, in addition to what was required for extinguishing fires. The estimated cost of the whole work was \$300,000. On the 1st of February following, the Committee reported the draft of an act to enable the carrying into operation of their plan, which was forwarded to the Legislature, and by that body, on the 10th of April, 1849, enacted into a law. The act provides that the Mayor and Aldermen should appoint three persons to be known as "The Water Commissioners of the City of Brooklyn," who shall hold their offices for three years, and whose duty it will be to examine and consider all matters relative to a supply of water for the city. They were empowered to employ engineers, surveyors, and other assistants to aid them, and were required to adopt, first, a plan for procuring a sufficient supply for all the uses of the inhabitants. They were required to report to the Common Council, who were empowered, if they deemed it best, to adopt the first plan separately, and direct the work to be proceeded with at once, to meet the expenses of which they were authorized to borrow a sum not exceeding \$150,000 at 6 per cent interest, on a credit of from thirty to thirty years. In the event of the Common Council approving of the general plan, they were required to submit the question of its adoption or rejection to the electors. If it received the approval of a majority of the electors, the Common Council was authorized to direct the work to be proceeded with, and to borrow a sum not exceeding \$500,000 to defray the expenses thereof. On the 18th of June, 1849, a movement was made in the Common Council with the view of commencing operations under the law, by proposing the election of Water Commissioners. All action was, however, postponed until after the next meeting of the Legislature, in order that certain amendments, deemed necessary, might be made to the law.

The Common Council paid little attention to the subject in 1850. A proposition was made in July of that year, by Mr. John Disbrow, to construct a reservoir on Prospect Hill, to obtain a supply of water from shafts sunk in the earth in that vicinity, and raise it by means of machinery into the reservoir, which was to be constructed by sections, each section to contain 1,000,000 gallons. One section was to be put in working order within a year, and to be filled daily with water. The cost was not to exceed \$300,000, exclusive of the land, and, if desired, the supply of water was to be increased by adding additional sections to the reservoir, at the same rate of cost. No action was had on this proposition.

On the 13th January, 1851, it was referred to a special committee to report what action was expedient to procure a supply of water, and on the 1st of February ensuing the committee reported, recommending an application to the Legislature for such an amendment to the charter as would give the Common Council further power in the premises. This report was adopted. In June, 1851, the water committee was constituted a standing committee of the Board, and soon after the committee was instructed to make such investigations as they might deem necessary in order to bring the subject before the Common Council for definite action. In September following another resolution was adopted, authorizing the committee to employ a competent engineer to make a thorough examination of all matters connected with the subject. In November the sum of \$4,000 was appropriated for the use of the committee, to defray expenses which they must incur in the prosecution of their labors. On the 8th December the City Clerk was directed to publish notice of the intention of the Common Council to apply to the Legislature for authority to contract a loan for the purpose of providing the necessary means to meet the expense that might be incurred in bringing a supply of water to the city. On the 21st of the same month the Committee submitted a report of progress with a general outline of a plan of supply prepared by W. J. McAlpine, Jr. This plan adopted the streams on the south side of Long Island as a source of supply to be conveyed by means of a conduit, and pumped up into a reservoir to be constructed on Prospect Hill to a capacity of sixty millions gallons, and thence distributed throughout the city. Accompanying the report is an analysis of the quality of the water made by Dr. Chilton, which will be found interesting, as the sources from whence it was obtained are included among those which now supply the city.

Water from *Baileys Pond, Jamaica South, Nov. 26, 1851.*

Carbonate of lime.....	1.062	Suphate of magnesia.....	2.38
Carbonate of magnesia.....	4.6	Oxide of iron.....	2.68
Chloride of sodium.....	244	Organic matter.....	8
Chloride of calcium.....	120	Total grains.....	2,645
Chloride of lime.....	120	Total grains.....	2,645

Water from *Peter's Pond, Nov. 26, 1851.*

Carbonate of lime.....	1.062	Suphate of magnesia.....	2.38
Carbonate of magnesia.....	4.6	Oxide of iron.....	2.68
Chloride of sodium.....	244	Organic matter.....	8
Chloride of calcium.....	120	Total grains.....	2,645
Chloride of lime.....	120	Total grains.....	2,645

Water from *J. L. Nostrand's Pond, Nov. 26, 1851.*

Carbonate of lime.....	1.062	Suphate of magnesia.....	2.38
Carbonate of magnesia.....	4.6	Oxide of iron.....	2.68
Chloride of sodium.....	244	Organic matter.....	8
Chloride of calcium.....	120	Total grains.....	2,645
Chloride of lime.....	120	Total grains.....	2,645

Water from *J. L. Nostrand's Pond, Nov. 26, 1851.*

Carbonate of lime.....	1.062	Suphate of magnesia.....	2.38
Carbonate of magnesia.....	4.6	Oxide of iron.....	2.68
Chloride of sodium.....	244	Organic matter.....	8
Chloride of calcium.....	120	Total grains.....	2,645
Chloride of lime.....	120	Total grains.....	2,645

Chloride of lime..... 1.062  
Carbonate of magnesia..... 4.6  
Chloride of sodium..... 244  
Chloride of calcium..... 120  
Chloride of lime..... 120

The Committee recommended the approval of the plan of Mr. McAlpine and its submission on the fourth Tuesday of January, 1852, to a vote of the people. They also asked leave to prepare a bill to be submitted to the Legislature in the event of the popular adoption of the plan. On the 25th of December, the report was taken up, and the recommendation of the Committee adopted. This completed the action taken in 1851, and its most important feature, it will be perceived, was the adoption for the first time of a definite plan of supply. The well-system was utterly rejected as insufficient and impracticable, and from that time its advocates have never been able to rally to its support with any considerable degree of strength or influence.

On the 19th January, 1852, the Water Committee reported a resolution recommending indefinite postponement of the day for popular action on the question, and authorizing the further prosecution of the surveys and examinations then in progress, which resolution was adopted. The reason assigned for the adoption of this course was, that the report of the Committee of December was not considered by the people as sufficiently minute in its statements as to warrant, at that time, a commencement in the prosecution of the enterprise, and a very general desire was expressed that, before the question was formally submitted to the people, estimates more in detail should be presented.

On June 8, 1852, the Committee submitted what may be styled the final report, embodying the plan of Mr. McAlpine, an outline of which accompanies their report of Dec. 22, 1851, in detail. It is too voluminous to be embodied in this description. The sources of supply recommended is found in the streams which enter the ocean on the southern side of the island, commencing with Jamaica Creek, and ending with East Meadow Creek—the first being thirteen miles from Fulton Ferry, and a little over nine miles from the pump-well. The supply which each stream would furnish is thus estimated:

From pump-well-miles.	Daily Sup. Gallons.	Az. sup. Gallons.
Jamaica Creek.....	8.2	6,500,000
Springside Creek, west branch.....	11.9	1,200,000
Springside Creek, east branch.....	12.1	250,000
Hook, west branch.....	12.2	4,000,000
Hook, middle branch.....	12.3	10,000,000
Hook, east branch.....	14.2	2,000,000
Port Jervis Creek.....	18.2	2,000,000
Port Jervis Creek.....	22.7	10,000,000
Millbrook Creek.....	19.9	2,000,000
East Meadow Creek.....	21.3	32,250,000

The general plan proposed was to collect the water in reservoirs formed by raising the water in streams by long dams to an elevation of from 12 to 25 feet above low tide. From these lateral conduits were to connect with a line of main aqueduct which terminated at a pump, well located at Flatbush; thence the supply was to be forced by steam engines and pumps through large iron mains, into the distributing reservoir on Prospect Hill, and thence distributed through the city by cast iron pipes in the usual manner.

While this action was being taken in the City of Brooklyn, the citizens of Williamsburgh (since 1851, consolidated with the City of Brooklyn), were not inattentive to the importance of obtaining a sufficient supply of water. The agitation of the question in that community resulted in the incorporation by the Legislature on the 10th of April, 1852, of the Williamsburgh Water Company, with a capital stock of \$250,000 for the purpose of securing for that city a good and sufficient supply of water. The project entertained by the Williamsburgh Company was the sinking of wells and the pumping of water therefrom into reservoirs, or collecting it from the ponds and streams on the north side of the Island; but upon investigation, the idea of obtaining a supply from those sources was abandoned.

On the 8th of June, 1853, was incorporated the Long Island Water Company, which absorbed and succeeded the Williamsburgh Company, with a capital stock of \$3,000,000, and empowered to furnish a supply of water from the stream on the south side of the Island to Brooklyn as well as Williamsburgh, should they be able to succeed in negotiating with the corporate authorities of that city for that purpose. This private Company, under the Presidency of Nicholas Dean, esq., for many years connected with the Croton Aqueduct Department in New-York, lost no time in securing, in advance of the Brooklyn Common Council, the most prominent streams which were relied upon as sources of supply for that city.

In September, 1852, the Water Committee was authorized to enter into contract for the purchase of such land as might be necessary for the purposes of a distributing reservoir, &c. In November following an application was received from the Williamsburgh Company proposing to supply the City of Brooklyn with water, which the Common Council, with some indignation, gave them leave to withdraw. Though there was continual action from time to time on the subject in the Common Council, including the adoption of a remonstrance against increasing the capital stock of the Williamsburgh Company, yet there was nothing done of any particular importance till the 28th April, 1853, when, in secret session of the Common Council, resolutions were agreed to finally determining that the plan of Mr. McAlpine should be adopted. At the same meeting a Special Committee was appointed to negotiate for the purchase of lands, &c., necessary for the work. Public attention was now thoroughly aroused to the consideration of the question. The Common Council visited the streams, as did many citizens, and generally, the result of their examinations was to satisfy them that the supply was as amply sufficient as the quality of the water was pure and excellent.

On the 3d June, 1853, an act was passed by the Legislature providing for the submission of the question to the electors, and the Common Council designated Monday, July 11, as the day upon which the vote should be taken. The Committee prepared the outline of a plan for supplying the city with water, upon which the electors were to vote. The result was as follows:

Whole number of votes cast.....	9,945
For the Water Plan.....	4,000
Against the Water Plan.....	5,945

Majority against..... 1,929

This result dampened the ardor of the advocates of water only temporarily, for in February, 1854, the Water Committee of the Common Council asked and obtained consent to employ an engineer to aid them in their investigations of the subject, and to prepare such plans as they might agree upon. On the 13th of March the Committee reported a plan, which they had prepared, with estimates and surveys, made by Gen. Ward B. Burnett, Civil Engineer, who also had made the estimates of the Long Island Water Company. This plan adopted substantially the same sources of supply as were proposed by Mr. McAlpine—the location of the reservoir being changed from Prospect Hill to Cypress Hill—and contemplated the construction of works adequate to the supply of twenty millions of gallons daily, with a capacity for an increase to forty millions. Two engines were to be erected; capable of pumping ten millions of gallons daily; eighty miles of pipe were to be laid, and 800 hydrants provided for the then wants of the city. The whole expense of the works, including engines and pipes, was estimated at \$4,025,000—to which there was to be added \$45,000 for land, title of the Long Island Water Company, and other expenses, making the total expense, as estimated, \$4,500,000. The report was ordered to be printed, and the Committee was authorized to negotiate with the Long Island Company for a transfer of the title of the ponds in their possession to the city. For this purpose the Committee in their plan recommended the appropriation of \$150,000. It was resolved that the Legislature should be petitioned to amend the Water Act of 1853, so as to empower the

Common Council to have the works constructed by contract or otherwise, and also increasing the number of Water Commissioners from five to six.

On the 27th March, the report of the Committee was adopted. On the 11th May, a plan, to be submitted to the electors for their adoption or rejection, was agreed upon by the Common Council, and the 1st of June was fixed upon as the time for taking the sense of the people upon the subject. The result was as follows:

Whole number of votes cast.....	9,965
For the Water Plan.....	2,696
Against the Water Plan.....	7,269

Majority against the Water Plan..... 4,573

This result settled the question for the time being; but, on the 1st January, 1855, the act consolidating the Cities of Brooklyn and Williamsburgh and the Town of Bushwick into one municipal government went into full operation, and with the addition of territory and population thus made to the old City of Brooklyn commenced a renewed agitation of the water question. In February the Legislature amended the charter of the Long Island Water Company, and changed its name to that of "the Brooklyn Water Company." This corporation had not a very brief existence, however, for on the 12th of April, 1855, was incorporated "The Nassau Water Company," with authority to purchase all the property, effects, &c., of the Brooklyn Water Company. The capital of the Nassau Company was to be three millions of dollars, the Company being empowered to increase it to six millions if necessary, and the Common Council was authorized to subscribe to its stock, to an amount not exceeding \$1,300,000, and to issue bonds of the city in payment thereof. The Nassau Company, it will be seen, was the legal descendant and legitimate successor in the direct line of the Williamsburgh Water Company.

The Company promptly organized and at once petitioned the Common Council to authorize a subscription to its capital stock, to the amount proposed by its act of incorporation. On the 24th September, the Water Committee submitted a report in effect according to the propositions of the Company, and authorizing a conditional subscription to its capital stock of \$1,000,000. On the 15th November the report of the Committee was finally acted upon in the Common Council, and adopted by a vote of 27 yeas to 7 nays.

In April, 1856, a meeting of citizens was held at the City Hall. The result of their action was in effect to endorse the project of the Nassau Water Company, and they appointed a committee to confer with the Common Council on the subject. On the 5th of May, the Water Committee, after a conference with the Citizens' Committee, submitted a report. They recommended that the city should immediately subscribe the sum of \$1,300,000 to the stock of the Nassau Company, upon the basis of which the work could be commenced at once, and prosecuted up to the next session of the Legislature, when an application could be made for power to raise the necessary funds to carry on the works to their completion. They also reported that the Nassau Water Company proposed to contract with H. S. Welles & Co. for the construction of the works, at a cost not to exceed \$4,200,000, of the capacity for the delivery of 20,000,000 gallons daily. The Directors of the Nassau Company had retired from their positions, and the following gentlemen, whose names had been approved by the Citizens' Committee, were elected to fill their places: John H. Prentiss, Wm. Wall, Daniel Van Voorhies, James Carson Brovoort, Nicholas Wyckoff, Thomas Sullivan and Nathaniel Briggs.

On the 4th of June the Common Council took final action on the report of the Committee, and after a careful scrutiny of the contract and specifications, approved the same.

On the 31st of July the work was formally commenced. On that day the Common Council, the Water Company, and a large number of citizens proceeded to the site selected for the reservoir, and in their presence, broke ground with the usual appropriate ceremonies—the first shovel full of earth being thrown up by George Hall, esq., Mayor.

On the 11th February, 1857, an act was passed vesting the rights, interests, and property of the Nassau Company in the city, and constituting its Directors a Board of Commissioners to supervise the construction of the works under the contract entered into with Welles & Co.—it being provided that no alteration increasing the cost of the work should be made by these Commissioners without the consent of the Common Council. Provision was also made for the issue of additional six per cent bonds by the city to the amount of \$2,000,000, to make up the \$4,200,000, which the work is to cost, and also such further amount as might be necessary to pay the interest on the bonds already issued. The interest thereafter, if provided, should be met by taxation and the income of the works. It is under this act that the work has been prosecuted.

This brings us down to the present time, and to a description of the water sources and the works from which the city is supplied, with other details. The supply is obtained from the gravel plains forming the long southern slope of Long Island. The ridge of hills which form the back-bone of the Island, commencing at Prospect Hill, in the City of Brooklyn, and terminating at the eastern extremities of the Island, divides it into two long and irregular slopes—the north slope constituting about one-third and the south slope two-thirds of the area of the Island. The rain-fall, which forms the basis of all water supplies, is thus shed partly into Long Island Sound and partly into the bays on the Atlantic. The Engineers estimate two-thirds of it to fall on the southern slope.

It is from the rain-fall on the southern slope that the Brooklyn supply is derived. It is very rarely that rain water falls upon a formation so well adapted to filter it of all impurities, to store it and to equalize its delivery into the brooks throughout the season of the rain, which falls annually. A large proportion sinks directly into the open gravel and sand plains, instead of passing off rapidly, as in rocky or clayey formations, into the streams, and wasting itself in freshets. Much of the water of the Brooklyn supply must pass through one to four miles in width of the sand-filter bed, from which it escapes pure and colorless.

The supply now being brought into the city will be derived from a drainage area of about 35 square miles; while beyond this area, easterly, there remains over 150 square miles of available drainage, ground traversed by the same character of brooks and streams as on the portion now used.

The construction of the Brooklyn Water Works was commenced in the Spring of 1856. The water was available for use in the iron pipes laid within the city in December, 1858.

The works consist of the iron distribution pipes laid throughout the city, the receiving reservoir at Ridgewood, the iron force mains thence to the engine-house, the engine-house and engines, the conduit, canal, and six pond reservoirs situated upon many streams, where the brook waters are retained by dams for convenient delivery by branch conduits into the main conduit and canal.

A supplementary reservoir and engine will be built within the limits of the city, on Prospect Hill, to control the high grounds in that neighborhood. It is to be at an elevation of 175 feet above mean tide, and divided into two apartments, with 20 feet depth of water, holding 20,000,000 gallons.

has 15 feet of water in it. The other is not yet quite completed, and will not be ready to receive water for ten days yet.

There are two force mains laid, of 36-inch diameter, each to deliver the water from the pumping engines to the reservoir. There will be two check-valves on each line. The length of each force main is 3,100 feet. These pipes are very heavy—the iron of the pipe being 1 1/2 inch thick at the lower end of the line, and 1 1/4 inch thick at the upper end.

The Engine-House is not entirely finished, but promises to be completed inside and out, about the middle of June. It is 110 feet by 80 feet wide, with convenient boiler accommodations and coal-sheds on the wings. The pump-well, which is within the building, is large enough to accommodate four of the very large class of engines contemplated in the contract. There is but one engine erected. The second will be built this season. This engine has been pumping at intervals during the past month, and had filled the eastern division of the Ridgewood reservoir with fifteen feet of water, when it was stopped to adjust the valves. The cylinder of the engine is 90 inches in diameter and 10 feet stroke. There are two pumps of 36 inches in diameter each, and the same stroke. The engine was constructed by Woodruff & Beach of Hartford, Conn.

The conduit terminates at the pump-well, delivering there the waters received from the canal and ponds. It is 4 1/2 miles in length as completed at this date, with a fall of six inches to the mile. Its width inside is 10 feet, and height 8 feet 8 inches, with 5 feet of water. It will deliver over 40,000,000 of gallons in 24 hours.

At the eastern extremity of this conduit the open canal commences. This canal extends thence to Hempstead reservoir, a length of 7 3/4 miles.

The Water Commissioners, by a recent act of the Legislature, are authorized to change this open canal into a covered conduit, a change which the short experience this Spring of the effect of this open canal on the character of the water, already renders very desirable. It is presumed that this change will be effected during the season. In the meantime the water of Jamaica Pond, which is delivered into the present conduit at its eastern terminus will amply meet the wants of the city.

Upon the existing conduit, there are man-holes built every 1,000 feet, and two waste-pipes to pass off the surplus water, and arranged also to draw off the whole water, when necessary.

Upon the canal there are three of these waste-pipes. The collecting reservoirs upon the streams, already referred to, are: Jamaica Reservoir, Simonson's (or Brooklyn) Reservoir, Clear-street Reservoir, Cornell's (or Valley) Reservoir, Rockville Reservoir, and Hempstead Reservoir; a branch conduit connects each of these with the canal. The branches are sluiced at the upper ends, where the waters of each reservoir are controlled. In each of these reservoirs the vegetable deposits, the accumulation of a long period of years, has been entirely removed. The present bottom consists of sand or gravel. It was in Jamaica Reservoir that the remains of the mastodon were found, on the 27th of March, 1858.

The amount of water derived from these sources, as shown by gauges made during the dry seasons, is as follows:

No.	Gallons.
1. Hempstead stream.....	3,240,000
2. Clear-street stream.....	3,260,000
3. Valley stream.....	2,541,400
4. Clear stream.....	784,000
5. Rockville stream.....	2,000,000
6. Jamaica stream.....	3,275,000
Making a total of.....	15,705,000

These six reservoirs, together with other sources of water available within the limits of the works will furnish according to the gaugings of the proper streams a rate of nearly 20,000,000 of New-York gallons of water during the lowest stages of their brooks.

The works constructing under the present contract are predicated on a command of, and delivery of this amount of water, with pumping power to correspond. The population of Brooklyn now may be taken at one-third of the population of New-York. This proportion would give a consumption of water in Brooklyn of 10,000,000 of gallons daily, if the water now available in Brooklyn were generally and exclusively used by its inhabitants as is the Croton water in New-York, a condition of things which it will take some years to approximate to.

The amount of money thus far paid for land purchased for the water works along the entire line, is \$27,257 62, but a large sum claimed for damages still remains unpaid. These damages are claimed by the owners of mill-races whose business has been ruined in consequence of the diversion of the water. This is particularly the case with the mill property on the south or lower side of the line of the water works. All of the ponds, and the streams by which they are supplied, have been used for milling purposes since 1686. The first grant was made by the Town of Hempstead, to John Pine, the 20th of January, in that year. The next grant was made the same year to William Smith and Elias Doran, who were empowered to make use of the streams to run a grist-mill.

Similar privileges were granted to Joseph Haviland in 1688, to Wm. Jaycox and Nathaniel Pearson in 1690, to Henry Libinton in 1691, and to Major Jackson and Hope Willis in 1698. The streams were in most cases named after the proprietors, and when they were sold they were known by the name of the new owner. These water privileges have been held at great value for successive generations, and a large sum will therefore be required to meet all the demands which are made by the present proprietors, some of whom obtained possession by inheritance, but the majority by purchase. The question of damages is now, however, before the Commissioners appointed by the Supreme Court for adjustment.

The pipes which lead from the Reservoir throughout the streets of the city are mainly of iron, while a small portion are composed of cement. It was thought at first that the latter were better adapted for the purpose intended than the iron ones, but it has been found that they are more liable to injury than the former. About two miles were laid as an experiment, in the district bounded by Division avenue, Wilson street, First street, and Kent avenue. The pipes are laid four feet beneath the surface of the street. The largest were manufactured in Edinburgh, Scotland, and the remainder in Pennsylvania and New-Jersey. Before being put to use they were tested by a hydraulic pressure of 300 pounds to the square inch, and required to be free from all imperfections. The were also subjected to the hammer test, and those found sound in every respect were accepted, and the remainder thrown aside. In case of breaks or alterations in the pipes, the stop-cocks—about 700 in number, at convenient distances apart, in no case exceeding 3,000 feet—are shut down on both sides of the breaks, so that but a small part of the inhabitants are debarred of the use of the water, as all repairs are made rapidly, and the detention seldom exceeds an hour or two. The method of tapping is the same as used in New-York and Jersey City. The tap is increased in strength to equal the pressure this city will have over the above cities. The mode of connection for the houses is the same, but more substantial. The Commissioners have jurisdiction of the tap and connections to the line of the street or houses. The highest point of distribution will be in the neighborhood of Bedford, and the lowest along the East River. The following table will show the number of leaks in the iron pipes, when first filled, on the 4th of December, 1858:

Size of pipe.	No. of leaks.	Per 100 ft.
6 inches.....	63	0.33
8 inches.....	25	0.34
12 inches.....	17	0.46
20 inches.....	17	0.82
24 inches.....	17	0.77
36 inches.....	9	0.60
Average.....		0.5100

The condition of the cement pipes as to leakage, will be seen by the following table:

Size of pipe.	No. of leaks.	Per 100 ft.
6 inch pipes, 15 leaks.		
8 inch pipes, 5 leaks.		
12 inch pipes, 2 leaks.		
24 inch pipes, 1 leak—average 10.66 100.		

Water for fire purposes was first used on the night of December 12th, on a building owned by Thomas Glavely, corner of Myrtle av. and